

CLAIMS

What is Claimed is:

1. A fan assembly comprising:

a fan; and

a switched reluctance fan motor that includes a shaft that is connected to said fan, wherein said switched reluctance fan motor includes a stator including a plurality of circumferentially-spaced stator segment assemblies that include a stator segment core and winding wire wound around said stator segment core, a rotor that is connected to said shaft and that defines a plurality of rotor poles, wherein said rotor tends to rotate relative to said stator to a rotational position that maximizes the inductance of an energized winding, and a drive circuit that energizes said winding wire around said stator segment assemblies based on said rotational position of said rotor.

2. The fan assembly of claim 1 further comprising a fan housing, wherein said fan housing includes an inlet and an outlet, wherein said switched reluctance fan motor is mounted in said fan housing and wherein said fan is an axial fan.

3. The fan assembly of claim 1 further comprising a fan housing, wherein said fan housing includes an inlet and an outlet, wherein said switched reluctance fan motor is mounted in said inlet and wherein said fan is a squirrel cage fan.

4. The fan assembly of claim 1 wherein said stator segment core includes stator plates with a radially outer rim section and a tooth section that extends radially inwardly from a center portion of said radially outer rim section.

5. The fan assembly of claim 4 further comprising:
an insulation layer located between said winding wire and said stator segment core.

6. The fan assembly of claim 4 further comprising:
projections extending from opposite sides of a radially inner end of said tooth section.

7. The fan assembly of claim 6 further comprising:
first and second end caps connected to opposite axial ends of said stator segment core; and

first and second end cap retainer sections that extend along said projections and that connect said first and second end caps,

wherein said first and second end caps and said first and second end cap retainer sections reduce movement of said winding wire during use.

8. The fan assembly of claim 4 wherein said stator plates of said stator segment core include radial and lateral slits and first and second central portions that are deformed using a punch to hold said stack of stator plates together.

9. The fan assembly of claim 1 wherein said drive circuit senses rotor position using sensorless techniques.

10. A fan assembly comprising:

a fan;

a switched reluctance fan motor that rotates said fan; and

a stator for said switched reluctance fan motor including a plurality of circumferentially-spaced stator segment assemblies that are arranged around an inner surface of a motor housing, each of said stators segment assemblies defining a salient stator pole that extends in a radially inward direction, wherein inter-polar stator slots are defined between adjacent stator segment assemblies, and said stator segment assemblies including a stator segment core and winding wire that is wound around said stator segment core.

11. The fan assembly of claim 10 wherein said fan is an axial fan.

12. The fan assembly of claim 10 wherein said fan is a squirrel cage fan.

13. The fan assembly of claim 10 wherein said stator segment core includes stator plates with a radially outer rim section and a tooth section that extends radially inwardly from a center portion of said radially outer rim section.

14. The fan assembly of claim 13 further comprising:

an insulation layer located between said winding wire and said stator segment core.

15. The fan assembly of claim 13 further comprising:
projections extending from opposite sides of a radially inner end of said tooth
section.

16. The fan assembly of claim 15 further comprising:
first and second end caps connected to opposite axial ends of said stator segment
core; and

first and second end cap retainer sections that extend along said projections and
that connect said first and second end caps,

wherein said first and second end caps and said first and second axial end cap
retainer sections reduce movement of said winding wire during use.

17. The fan assembly of claim 13 wherein said stator plates of said stator segment
core include radial and lateral slits and first and second central portions that are deformed to
hold said stator segment core together.

18. A fan assembly comprising:

a fan housing including an inlet and an outlet;

a fan that rotates inside said fan housing;

a shaft that is connected to said fan; and

a switched reluctance fan motor including a motor housing, a rotor that is connected to said shaft and that rotates relative to said motor housing, and a stator that is mounted on an inner surface of said motor housing, said stator including a plurality of circumferentially-spaced stator segment assemblies, wherein said stator segment assemblies include a stack of stator plates forming a stator segment core and winding wire that is wound around said stator segment core, wherein each of said stator plates has a generally "T"-shaped cross-section, a radially outer rim section, and a tooth section that extends radially inwardly from a center portion of said radially outer rim section.

19. The fan assembly of claim 18 wherein said fan is an axial fan.

20. The fan assembly of claim 18 wherein said fan is a squirrel cage fan.

21. The fan assembly of claim 18 further comprising:

an insulation layer located between said winding wire and said stator segment cores.

22. The fan assembly of claim 18 further comprising:
projections extending from opposite sides of a radially inner end of said tooth
section.

23. The fan assembly of claim 22 further comprising:
first and second end caps connected to opposite axial ends of said stator segment
core; and

first and second end cap retainer sections that extend along said projections and
that connect said first and second end caps,

wherein said first and second end caps and said first and second end cap retainer
sections reduce movement of said winding wire during use.

24. The fan assembly of claim 18 wherein said stator plates of said stator segment
core include radial and lateral slits and first and second central portions that are deformed to
hold said stator segment core together.

25. The fan assembly of claim 18 further comprising:
a drive circuit connected to said winding wire of said stator segment assemblies,
wherein said drive circuit senses rotor position using sensorless rotor techniques position.